District of Columbia Work Zone Safety and Mobility Policy

October 2007

d.
District Department of Transportation

Cover Letter by Director, DDOT

The District of Columbia Work Zone Safety and Mobility Policy

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ABBREVIATIONS

ADA	Americans with Disabilities Act of 1990
ATSSA	American Traffic Safety Services Association
DCBIA	District of Columbia Building Industry Association
DCPS	District of Columbia Public Schools
DDOT	District Department of Transportation
FEMS	Fire and Emergency Medical Services
FHWA	Federal Highway Administration
IMSA	International Municipal Signal Association
IPMA	Infrastructure Project Management Administration
IPMA, DPMD	Design and Project Management Division
IPMA, SSQCD	Office of Safety Standards and Quality Control Division
ITS	Intelligent Transportation Systems
MOTAA	Maintenance of Traffic Alternative Analysis
MPD	Metropolitan Police Department
MWCOG	Metropolitan Washington Council of Governments
NUCA	National Utility Contractors Association
OD	Office of Director
PE	Project Engineer
PI	Public Information
PI & O	Public Information and Outreach
PM	Project Manager
SAFETEA-LU	Safe Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHSP	Strategic Highway Safety Plan
TCP	Traffic Control Plan
TMA	Transportation Management Area
TMP	Transportation Management Plan
TO	Traffic Operations
TOA	Transportation Operations Administration
TOA, TOD	Transportation Operations Division
TSO	Traffic Safety Officer
TTC	Temporary Traffic Control
WASA	DC Water and Sewer Authority
WMATA	Washington Metropolitan Area Transit Authority

I. POLICY STATEMENT

The District Department of Transportation (DDOT) is committed to reducing congestion in and around work zones without compromising the safety of workers and the public. This policy provides guidance for assessing work zone impacts related to mobility and safety issues on the traveling public across the various stages of all Federal-Aid Highway-funded projects and to develop proper management strategies to reduce these impacts.

II. SCOPE

This policy applies to all Federal-Aid Highway-funded projects performed on:

- Interstates
- Other Freeways and Expressways
- Principal Arterials

III. BACKGROUND

The Federal Register, September 9, 2004, published the Work Zone Safety and Mobility Rule. All State and local governments that receive Federal-Aid funding are required to comply with the provisions of the rule no later than October 12, 2007. The Rule updates and broadens the former regulation 23 CFR 630, Subpart J. Changes to the regulation will encourage broader consideration of safety and mobility impacts of work zones across project development and implementation of strategies that help manage these impacts during project delivery.

The DDOT recently developed its own *Guidelines and Standards for Temporary Traffic Control*, which, when combined with Federal policy, will significantly improve the safety of road users and workers. This policy must be linked to other SAFETEA-LU requirements such as the District-based Strategic Highway Safety Plan (SHSP).

IV. TARGET AUDIENCE

The target audience(s) for this document includes anyone involved in planning, designing, constructing, and monitoring all Federal-Aid Highway Projects in the District of Columbia, such as:

- DDOT
- Utilities
    - PEPCO
    - Verizon
    - Washington Gas
- DC Water and Sewer Authority (WASA)
- US Park Police
- Metropolitan Police Department (MPD)
- Fire and Emergency Medical Services (FEMS)
- Consultants
- Contractors

V. POLICY PROVISIONS

- Implement a policy for the systematic consideration and management of work zone impacts for all Federal-Aid Highway-funded projects.
- Address work zone impacts throughout the various stages of the project development and implementation process.
- Identify upcoming projects expected to be significant. For significant projects, develop a Transportation Management Plan (TMP) that consists of a Temporary Traffic Control Plan (TTC) and addresses both Traffic Operations (TO) and Public Information (PI) components.
- Use field observations, available work zone crash data and operational data to manage work zone impacts for specific projects during implementation.
- Continually pursue improvement of work zone safety and mobility by analyzing work zone crash and operation data from multiple projects to improve processes and procedures.
- Develop a training program for personnel involved in the development, design, implementation, operation, inspection and enforcement of work zone-related transportation management and traffic control.
- Assess the effectiveness of work zone safety and mobility procedures by conducting a process review every two years.

VI. DISTRICT-LEVEL PROCESSES AND PROCEDURES

The following section details the various agency-level processes and procedures that should be performed to support the new work zone policy implementation during the project life cycle, as wells as post life cycle.

A. Project Life Cycle
    1. Planning/Design/Pre-Construction
    2. Construction Stage
    3. Post Construction Stage
B. Process Review
C. Training

Figure 1.1 (page 5) illustrates the development of District-level process and procedures for implementing the policy. *IPMA Project Manger will be the team lead unless otherwise determined by the DDOT Chief Engineer.*

A. Project Life Cycle

1. Planning/Design/Pre-Construction

1.1. Compile Project Material

The Project Manager responsible for each stage of the project compiles project material such as:

- Project scope and limits.
- Roadway and traffic characteristics (including non-motorized issues).

- Local community issues.
- Preliminary cost estimates for strategy implementation (when available).
- Information from other projects in the corridor to evaluate the combined or cumulative impact of the projects.
- Information on existing geometric and traffic characteristics and crash trends.
- Existing cultural resources and right-of-way maps.
- Public outreach and community information.
- Construction phasing/staging approaches and plans.
- Environmental impact study.

Outcome: Information for impact assessment.

1.2. Identify Significant Project and Determine TMP Needs

A significant project is one that alone or in combination with other concurrent projects nearby is anticipated to cause sustained work zone impacts that are greater than what is considered tolerable based on DDOT policy and/or engineering judgment. Work zone impacts refer to work zone-induced deviations from the normal range of transportation system safety and mobility conditions. The District shall identify upcoming projects that are expected to be significant. Significant projects should be identified as early as possible in the project delivery and development process, and in cooperation with the FHWA.

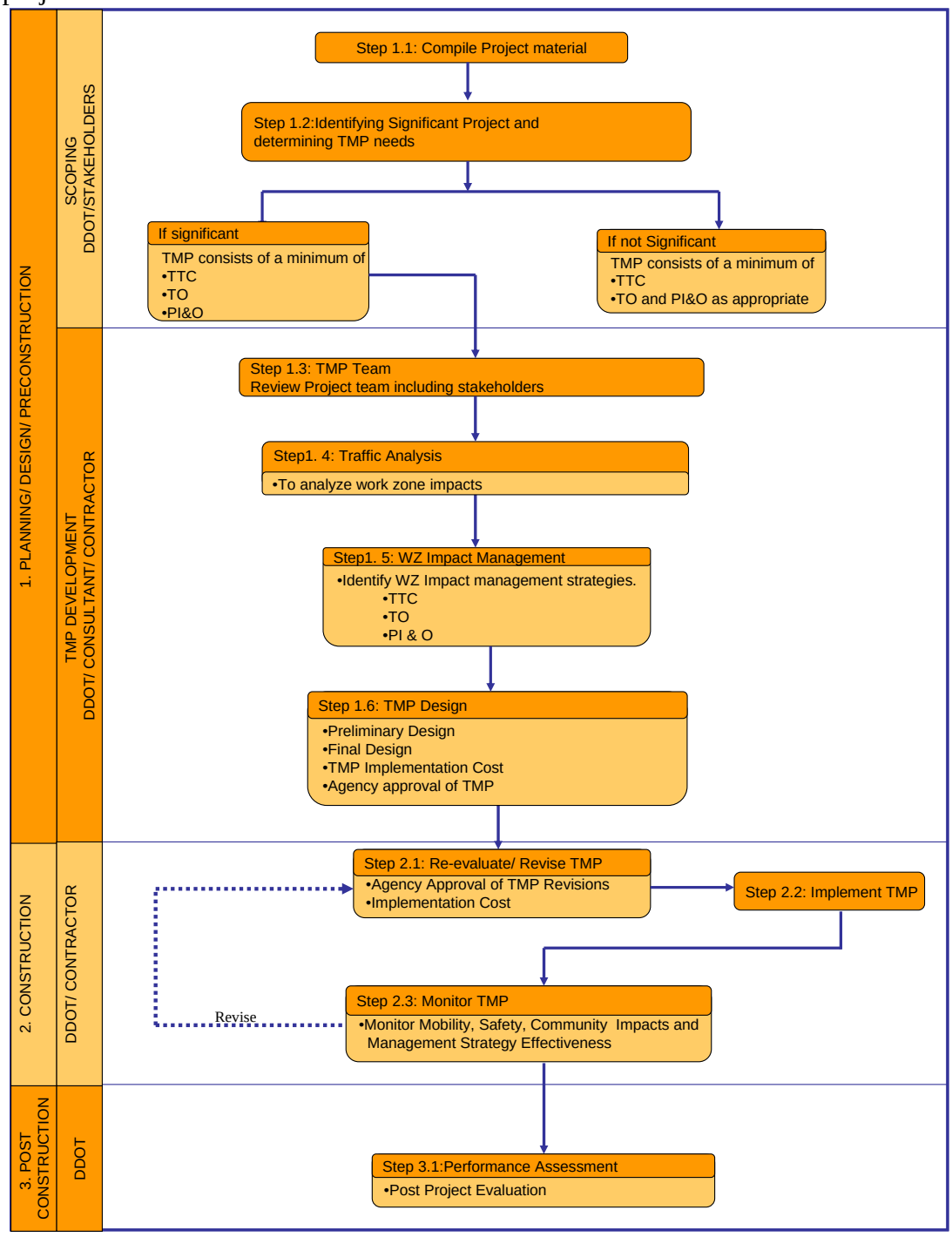
DDOT, in consultation with the project partners, should determine significant projects during the planning stage. The following projects are considered to be significant:

A. All projects on Interstates, Freeways, and Expressways that occupy a location for more than three days with either intermittent or continuous lane closures.
B. Federal-Aid Highway-funded reconstruction projects (refer to appendix H for definition of reconstruction projects) on all Principal Arterial roads.

Appendix A provides additional information on significant projects.

A TMP is required when the project is significant. This consists of a Temporary Traffic Control Plan (TTC), as well as Transportation Operations (TO) and Public Information and Outreach (PI&O) Strategies. The extent of TO and PI&O depends on the level of work zone impact. When multiple projects are planned in the same corridor or on corridors within the same traffic area, it may be possible to develop a single corridor or regional TMP.

Figure 1.1: Development of District Level Processes and Procedures for significant projects



*Note: For projects not undergoing the Planning/Design stage, develop and get approval of the TMP, which consists of a TTC and appropriate TO and PI&O strategies, prior to the start of construction.

If a TMP is required, then funds must be allocated in the cost estimate for developing the TMP at this stage of the project. The design budget should be increased to reflect efforts

required to develop the TMP. If a consultant develops the TMP, then the consultant scope of work and budget should reflect these efforts.

Identify Significant projects and Determine TMP needs	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓			
When should it be completed?	During the early planning stage.			
Documentation	Present finding of the significant project type at the scoping meetings and include in meeting minutes.			

Outcome: Determining the significant project status and TMP needs.

1.3. TMP Team

The DDOT Project Manager is responsible for revising the TMP Team to include additional stakeholders based on project needs. Finalizing the list of stakeholders depends on the project type, extent and duration of construction, and length of the work zone. Always consider the work zone's geography, business, and residential environment. Identify and consult stakeholders throughout the design and construction process, and add members to the team as required. Stakeholders provide project input by identifying project elements, events, or safety/mobility concerns that should be evaluated in the TMP. Refer to Section C, page 14, for minimum training requirement of key TMP personnel.

The stakeholders may include:

- DDOT Personnel
- Other District Agencies (e.g., FEMS, MPD, DCPS)
- Washington Metropolitan Area Transit Authority (WMATA)
- Railroad Agencies/Operators
- Freight Operators
- Metropolitan Washington Council of Governments (MWCOG)
- National Utility Contractors Association (NUCA, local representative)
- District of Columbia Building Industry Association (DCBIA, local representative)
- Utility Providers
- Metropolitan Police (and other emergency service providers as deemed necessary)
- Business Representatives
- School Representatives
- Community Groups
- Citizens' Interest Groups

It is incumbent on the Project Manager to include all necessary stakeholders from the project scoping stage.

Outcome: TMP Team.

1.4. Traffic Analysis

Conduct a queue/delay analysis for significant projects to minimize the work zone severity and duration of mobility impacts on the traveling public. Use mainline queue length as the criteria to determine the impact of proposed work zones. The District may use Quickzone, Quewz-92, Synchro/Simtraffic, Corsim, or similar programs to model the expected queues to be generated.

Factors to be considered:

- Analyze multiple phasing of construction separately.
- Use the posted legal construction zone speed limit in the computer models.
- Input traffic volume data no older than three years, and current regional traffic patterns into the computer model and account for seasonal traffic variations that may occur during construction.
- Use growth factors provided by DDOT to expand traffic volumes to construction year levels.
- Include the effect of significant ramp merges on queues in the model.
- Include non-motorized data (pedestrian/bicyclist) in any modeling.
- Consider pedestrian-accessibility requirements (ADA, Title II Regulations).

Refer to appendix B for guidance on traffic analysis.

Outcome: Analyzing the work zone impact.

Traffic analysis	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓			
When should it be completed?	Prior to selecting preferred construction phasing			
Documentation	A report documenting the traffic analysis.			

1.5. Work Zone-Impact Management Strategies

This step involves identifying potential work zone management strategies based on impact assessments conducted in the previous steps. Use work zone-impact management strategies to minimize traffic delays, improve mobility, maintain or improve motorist and worker safety, complete roadwork in a timely manner, and maintain access for businesses and residents. Develop strategies in such a way that they are suited to the scale of the work zone impacts. As the project progresses through the various developmental stages, and as more project-specific information becomes available, review and revise the type of traffic control selected and impact management strategies as necessary.

For the TMP, identify work zone impact management strategies for both the mainline and detour routes for the selected construction phasing/staging approaches. Where appropriate, document the management strategies on plan sheets. Agencies may elect to

develop separate sections or plans specific to the PI and/or TO strategies to distinguish them from the TTC strategies.

Group the various work zone management strategies according to the following three categories:

- Temporary traffic control (TTC):
  - Control strategies.
  - Traffic control devices.
  - Project coordination, contracting, and innovative construction strategies.
- Transportation operations (TO):
  - Demand-management strategies.
  - Corridor/network management (traffic operations) strategies.
  - Work zone safety management strategies.
  - Traffic/incident management and enforcement strategies.
- Public information (PI):
  - Public awareness strategies.
  - Motorist information strategies.

Refer to appendix C for an overview of work zone impact management strategies and appendix D for work zone design checklist, which provides a summary of Work Zone Impact Management Strategies.

Outcome: Identifying work zone impact management strategies.

Work Zone-Impact Management Strategies	**IPMA**	**TPPA**	**TOA**	**PI**
Who is responsible?	✓	✓	✓*	✓
When should it be completed?	Refer Section 1.6.1 and 1.6.2			
Documentation	Refer Section 1.6.1 and 1.6.2			

* If ITS involved

1.6. TMP Design/Development

1.6.1. Preliminary Design

Refine initially identified TMP elements at this stage. This is particularly important for elements requiring long lead times needing to be established prior to the start of construction. This may include consultant contracts for public information and outreach campaigns and other improvements requiring completion prior to construction. The TMP Team should work with technical specialists, including construction, traffic, engineering, and public information officers, to jointly identify/confirm the work zone impacts that must be accounted for, as well as any proposed strategies. Address construction equipment and material access to the site, storage, and staging areas at this time, as well as potential infrastructure improvements to accommodate future projects. If the design has changed, perform additional analysis to address these changes. The TMP developer will provide all required data for DDOT.

At a minimum, the concept/draft TMP submittal should include:

- Introductory material
- Executive Summary
- TMP Roles and Responsibilities
- Project Description
- Existing and Future Conditions
- Work Zone Impacts Assessment Report
- TMP Monitoring
- Public Information and Outreach Plan
- Incident Management
- TMP Implementation Costs
- Special Considerations (as needed)
- Attachments (as needed)

Outcome: Draft Report.

TMP Draft Report	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓		✓*	
When should it be completed?	Submitted along with 30% and 60% of PS&E.			
Documentation	Draft TMP Report			

* If ITS involved

1.6.2. Final Design

During this stage, finalize the TMP and develop detailed plans, specifications, and estimates. The designer is responsible to implement recommendations set forth in the draft TMP document. The designer may be required to collect more data and conduct additional analyses to reflect changes in the project design. Consult the TMP Team when design and TTC decisions dictate a revision to the Draft TMP work zone impact mitigation strategies. Show the work zone impact management strategies on the plans, where applicable. Appendix E provides a detailed outline of TMP Report.

Outcome: Final TMP report.

TMP Draft Report	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓		✓*	
When should it be completed?	Submitted along with 90% of PS&E.			
Documentation	Final TMP Report			

* If ITS involved

1.6.3. TMP Implementation Cost

It is crucial to estimate the TMP implementation cost within the overall project cost, as it may be difficult to obtain additional funding at a later time. It can potentially avoid under-allocation of funds. Where feasible, itemize and document cost estimates for the

various strategies in the TMP with cost responsibilities, opportunities for sharing, any coordination with other projects, and funding sources. Increase the construction budget to reflect efforts required to implement the TMP, including any data collection required for monitoring/evaluation of TMP implementation (see Section 2 and 3). Determine pay items to be included in the PS&E during design. (Refer to DDOT *Standard Specifications for Highways and Structures for Measurement and Payment of Items*). At the latest, by 60% design, develop a detailed estimate for implementing elements of the TMP. Individual projects may have varying pay items depending on size, complexity, and location. TMP components can be funded as part of the construction contract and/or in separate agreements. Also, the costs of TMP development and implementation can be estimated as a percentage of the construction project costs.

Outcome: Overall cost for implementing the TMP.

TMP Implementation cost	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓		✓*	✓
When should it be completed?	Submitted at or before 60% of PS&E.			
Documentation	Refer Section 1.6.1 and 1.6.2.			

* If ITS involved

1.6.4. Agency Approval of TMP

The designated DDOT Chief Engineer/Deputy Chief Engineer should approve the final TMP design document before implementation.

Outcome: TMP approval.

2. Construction Stage

2.1. Reevaluate/Revise TMP

Review and modification of construction alternatives and traffic plans may occur before and during the course of projects. The Project Engineer will maintain current documentation regarding the changes and/or deficiencies noted in implementing the TMP and how and when they were corrected. Identify any major changes or notable items at the monthly partnering meetings during construction. Provide this information to the TMP Team upon completion of construction in a post-construction meeting for the purposes of relaying successes and failures back to the designers (refer Section 3.1 - Performance Assessment).

The Contractor shall submit all proposed TMP changes to DDOT Project Engineer for review and approval. Changes may include:

- Work activities that alter traffic control requirements.
- Scheduling of work activities.
- Project initiation or completion dates.
- Work zone impact management strategies.

When alternative construction phasing/staging plans or other management strategies have been suggested, DDOT technical specialists will review the revised TMP. The DDOT Project Engineer must approve all TMPs developed or revised during contracting or construction prior to implementation.

2.2. Implement TMP

Implement the TMP during construction (some elements may need to be implemented prior to construction, such as public information and outreach efforts or improvements to detour routes). Both DDOT and the Contractor must designate a trained person at the project level to implement the TMP and other safety and mobility aspects of the project. For DDOT, this person will most likely be the Construction Project Engineer (PE), refer Section C, page 14, for minimum training requirements. For the Contractor, this person will be the Traffic Safety Officer (TSO), as specified in the DDOT *Standard Specifications for Highways and Structures*, 2005 or later, Section 616.02(B1). These persons are responsible for efficiently and appropriately implementing the TMP. They are also responsible for reviewing traffic operations throughout the project limits on a regular basis, including the condition of all traffic control devices.

2.3. TMP Monitoring

Monitoring the performance of the work zone and TMP during the construction phase is important to establish whether the predicted impacts closely resemble the actual conditions in the field, and if the strategies in the TMP are effective in managing the impacts.

It is important for many reasons to monitor the project-traffic data is often stale, closures may be sloppy or non-conforming, and enforcement strategies may need to be modified for unanticipated events. The DDOT will monitor the TMP for both oversight and evaluation purposes.

Monitoring for oversight includes:
Determining how strategies are being implemented and verifying that specified TMP elements will occur on schedule and in the manner planned.

- Ensure Changeable Message Signs, Highway Advisory Radio, and other media tools provide accurate and timely information to motorists, bicyclists and pedestrians regarding lane closure times and other project information.
- Ensure contractor compliance with lane closure pickup times.

Monitoring for evaluation is important to:

- Assess and fine-tune performance of all TMP strategies and overall performance of the project corridor and alternative routes.
- Track public acceptance and ensure continuation of the project.
- Determine cost-effectiveness of individual TMP strategies and shift resources from the least to most cost-effective strategies.
- Determine whether additional TMP elements are needed or particular elements refined.

Examples of possible performance measures for TMP monitoring include volume, travel time, queue length, delay, number of incidents, incident response and clearance times, contractor incidents, community complaints, user costs, and cumulative impacts from adjacent construction activities. Base performance-monitoring requirements and performance measures, as stated above, on agency policies, standards, and procedures, are included in the project contract documents. Provide all data to DDOT for its analysis with respect to TMP monitoring.

Appendix F contains a sample of a Field Inspection Report.

Outcome: TMP implementation.

TMP Monitoring	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓	✓	✓	✓
Documentation	Field Inspection Report (Appendix F). TMP Performance/Monitoring Report			

3. Post-Construction Stage

3.1. Performance Assessment

Evaluations of work zone TMP policies, processes, and procedures aid in addressing and managing the safety and mobility impacts of work zones, particularly for significant projects and when using performance-based contracting. Focus TMP evaluation on overall TMP process and the actual field performance of the work zone and TMP. Various measures of effectiveness and measuring techniques are appropriate to corridor and strategy evaluation.

3.1.1. Post-Project Evaluation

The TMP should include references to the development of a short evaluation report upon completion of construction and identify the persons responsible for developing this report. The report should document lessons learned and provide recommendations on how to improve the TMP process and/or modify guidelines. Elements to consider for inclusion in the post-project evaluation are:

- Overall statement reflecting the usefulness of the TMP.
- Successes and failures.
- Areas of the TMP successfully implemented.
- Changes to the original TMP and results of those changes.
- Public reaction to the TMP.
- Frequency of legitimate complaints and nature of complaints (or compliments).
- Actual measures of conditions versus what was predicted (for example, predicted and encountered delay time).
- Cost for implementing the strategies.
- Types of crashes during construction.

- Suggested improvements or changes for similar future projects.

Outcome: Provide recommendations on how to improve the TMP process.

Post Project Evaluation	**IPMA**	**TPPA**	**TOA**	**OD(PI)**
Who is responsible?	✓	✓	✓	✓
When should it be completed?	Upon project completion			
Documentation	Post-Project Evaluation Report			

B. Process Review

Conduct a process review at least every two years. This review may include evaluation of work zone crash data and operational data for randomly selected projects. The DDOT will maintain the data and information resources needed to support the use of work zone data for the above activities. The results of TMP evaluations can be useful in the process reviews, and vice versa. Collecting, analyzing, and synthesizing findings from multiple projects can help to develop and implement future TMPs. The process review should include an annual work zone traffic control inspection ratings report and an annual work zone crash report. The work zone traffic control inspection rating report should consist of a summary of inspection ratings from the field inspection report of selected significant projects. The annual work zone crash report should present a crash trend analysis and comparison of work zone crashes District-wide. Additionally, the process review should include a review of randomly selected post-evaluation reports of significant projects to assess TMP process and strategies. Appropriate personnel, who represent the project development stages and different offices within the agency, FHWA, and non-agency stakeholders, should participate in the process reviews. The DDOT, IPMA will lead this process.

Outcome: Provide recommendations on how to improve/modify the TMP process and guidelines including the definition of significant project and traffic analysis criteria.

C. Training

All DDOT personnel, consultants, and contractors involved in the development, design, implementation, operation, inspection and enforcement of work zone-related transportation management and traffic control must be trained commensurate with their level of responsibility. Individuals may gain this training through DDOT-provided courses or outside sources. The initial training would be done over the next two years and include, at minimum, the following:

- Advanced Work Zone and Design Course (FHWA)
  - Team Leaders
  - Project Manager
  - Project Engineer
  - Traffic Engineer
- Design and Operation of Work Zone Traffic Control (FHWA)
  - Inspectors
  - Key Team Members
- Short Interactive Presentation (to be developed)
  - Enforcement Personnel
- Nighttime work zones (ATSSA)
  - Inspectors
  - Key Team Members
- Traffic Control and/or Work Zone training (ATSSA, IMSA)
  - Inspectors
  - Key Team Members
  - Flagger Training (ATSSA, IMSA)
  - Inspectors

Provide a refresher course to all the above-mentioned personnel every five years, which will reflect changing industry practices and new agency processes and procedures. DDOT, IPMA (SSQCD) will implement the minimum work zone training requirements as indicated above for their personnel. The DDOT is not responsible for training non-agency staff. For additional training requirements, refer to the DDOT *Temporary Traffic Control Manual*, 2006 or later.